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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

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REPLY TO: 3420

DATE: MAY 25 1988

SUBJECT: Biological Evaluation of Pine Mortality in Shasta Mud Flow Research Natural Area (Report No. 88-11)

TO: Forest Supervisor, Shasta-Trinity National Forests

Increased mortality of ponderosa pine has been observed in the Shasta Mud Flow Research Natural Area (RNA) during the past year. This has caused concern over the possibility that the insects commonly found in dying trees may emerge and attack trees in areas outside of the RNA.

Pine mortality has been a common occurrence on McCloud Flats, including the RNA, for decades. Office reports indicate increased levels of mortality in 1959, 1964, 1967-68, and 1975-76. Originally, this was attributed to "insect epidemics", primarily involving the western pine beetle, Dendroctonus brevicomis, that were attacking overstocked stands. In the early 1970's, it was discovered that black stain root disease, caused by Verticicladiella wageneri, was a common associate in this mortality. At that time, Forest Pest Management presented the Forest with alternatives to manage the disease/insect complex in the general forest in order to lessen future impacts of the pests.

In November 1987, Gregg DeNitto, pathologist, and Bruce Roettgering, entomologist, met with Bill Branham, McCloud Ranger District, to look at the situation in the RNA and surrounding areas. This visit was partly prompted by aerial survey results gathered by CDF&FP. Their survey had identified a large amount of mortality on McCloud Flats, with the RNA being heavily affected.

The organisms involved in the pine mortality that was examined included black stain root disease and western pine beetle. Where mortality was present, the stands were predominantly ponderosa pine with stocking levels above the normal basal area for the site. Observations outside of the RNA showed that tree mortality was high over much of the Flats and that, where it occurred, it too was related to stand and site conditions similar to those present in the RNA mortality centers. Although organisms are involved, the underlying cause which triggered the current episode of increased mortality is the below normal precipitation received the previous several years.

High levels of tree mortality are occurring throughout California this year because of these below normal precipitation conditions. Most of this mortality involves bark beetle activity and may be accentuated by other stress conditions, such as diseases and overstocking. Until the precipitation situation improves, we can expect mortality levels to remain high in most areas of the state.

The RNA will continue to have high levels of mortality during this drought period. Even during periods of normal precipitation, however, we expect mortality to be higher than the Forest average because of the widespread presence of the root disease and high stocking levels. Actions that might reduce mortality—creating mixed species stands at stocking levels appropriate to the site—do not meet the management objectives and direction for the RNA.

Surrounding private landowners have expressed the concern that the "insect epidemic" will spread to their lands. They are likely experiencing increased mortality now also because of the drought conditions. Because their principal management objective is timber production, they should not be limited in the activities which they can implement. By fostering healthy, vigorous, properly stocked stands their losses from insect attacks can be minimized. It is too late to protect those stands presently under stress from disease and/or overstocking from possible insect attack during this drought and they can expect increased opportunities for salvage. In stands that they have been managing in the recent past, they should see lower levels of mortality, regardless of the number of insects in the area.

During every adverse period when increased bark beetle activity is observed, a common perception is that aggressive action against the insects will lessen tree mortality. Rapid salvage of dead trees has not been shown to be effective at limiting further damage by western pine beetle over broad areas during these situations. Neither has it been shown that localized build-up of these insects will necessarily spill-over into surrounding areas. When conditions beneficial to the insects occur over large areas, such as droughts, tree mortality can be expected to increase as the insects take advantage of highly susceptible stressed trees. Stands that are being managed to reduce stress from disease and competition may pass through these periods with little tree mortality.

The Shasta Mud Flow RNA provides an opportunity for the Forest Service to monitor the natural processes that are causing ecological changes in naturally disturbed forest stands. It also provides a baseline or control situation to evaluate the effectiveness of management actions to lessen pest impacts in other areas of McCloud Flats.

If you have any questions about this report or require further assistance, please contact me or my staff.

John Neisess

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